

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte ALAN R. REINBERG

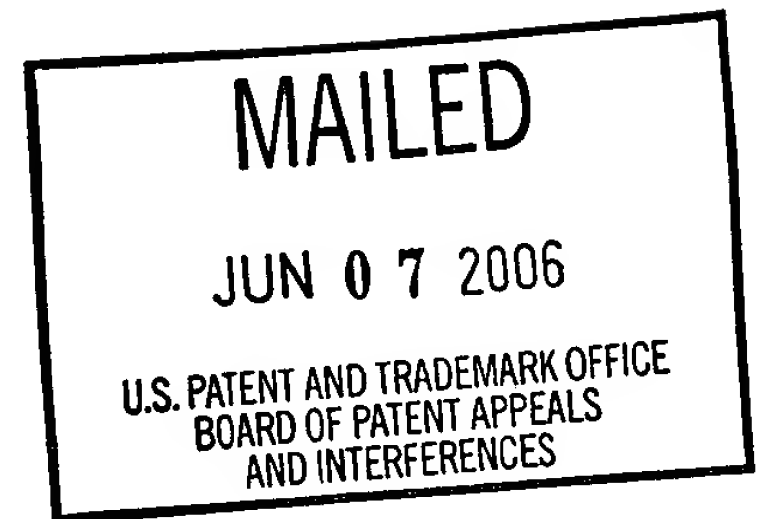
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Appeal No. 2006-1107  
Application No. 09/382,442

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ON BRIEF

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Before HAIRSTON, JERRY SMITH and SAADAT, Administrative Patent Judges.

JERRY SMITH, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal under 35 U.S.C. § 134 from the examiner's rejection of claims 1, 2 and 4-14. Pending claims 26-32 and 35-39 have been withdrawn from consideration.

The disclosed invention pertains to a method for reducing random single bit data loss in a FLASH memory circuit having a programming operation and an erase operation. A particular feature of the invention is that a semiconductor layer is heated in an atmosphere comprising a hydrogen isotope which incorporates

the hydrogen isotope into the semiconductor layer.

Representative claim 1 is reproduced as follows:

1. A method for reducing random single bit data loss in a FLASH memory circuit having a programming operation and an erase operation, comprising:

providing a semiconductor layer having a surface;

heating the layer in an atmosphere comprising a Hydrogen isotope wherein the Hydrogen isotope is incorporated into the layer; and

fabricating a memory circuit having a programming operation and an erase operation, comprising single bit data using the semiconductor layer, the fabricating comprising fabricating a gate region in the layer; treating a portion of the surface to form a thin layer of insulator film adjacent to the gate region and under the gate region; and heating the thin layer in an atmosphere comprising Hydrogen isotope, wherein single bit data loss is reduced and wherein random single bit data loss is prevented in both the programming operation and the erase operation.

The examiner relies on the following references:

Sheu	4,840,917	Jun. 20, 1989
Nakanishi	5,145,797	Sep. 08, 1992
Nakajima et al. (Nakajima)	5,397,724	Mar. 14, 1995
Lisenker et al. (Lisenker)	WO 94/19829	Sep. 01, 1994
(published World Int. Prop. Org. Patent Application)		

The admitted prior art.

Claims 1, 2 and 4-14 stand rejected under 35 U.S.C.

§ 103(a). As evidence of obviousness the examiner offers

Nakanishi in view of Lisenker and the admitted prior art with

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respect to claims 1, 2, 4, 5 and 7-10, with Nakajima added to this combination with respect to claim 6, and with Sheu added to the first combination with respect to claims 11-14.

Rather than repeat the arguments of appellant or the examiner, we make reference to the briefs and the answer for the respective details thereof.

#### OPINION

We have carefully considered the subject matter on appeal, the rejections advanced by the examiner and the evidence of obviousness relied upon by the examiner as support for the rejections. We have, likewise, reviewed and taken into consideration, in reaching our decision, the appellant's arguments set forth in the briefs along with the examiner's rationale in support of the rejections and arguments in rebuttal set forth in the examiner's answer.

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would not have suggested to one of ordinary skill in the art the obviousness of the invention as set forth in the claims on appeal. Accordingly, we reverse.

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the examiner to establish a factual basis to

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support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the examiner is expected to make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966). The examiner must articulate reasons for the examiner's decision. In re Lee, 277 F.3d 1338, 1342, 61 USPQ2d 1430, 1434 (Fed. Cir. 2002). In particular, the examiner must show that there is a teaching, motivation, or suggestion of a motivation to combine references relied on as evidence of obviousness. Id. at 1343, 61 USPQ2d at 1433. The examiner cannot simply reach conclusions based on the examiner's own understanding or experience - or on his or her assessment of what would be basic knowledge or common sense. Rather, the examiner must point to some concrete evidence in the record in support of these findings. In re Zurko, 258 F.3d 1379, 1386, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001). Thus the examiner must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the examiner's conclusion. However, a suggestion, teaching, or motivation to combine the relevant prior art teachings does not have to be found explicitly in the prior art, as the teaching, motivation, or suggestion may

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be implicit from the prior art as a whole, rather than expressly stated in the references. The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art. In re Kahn, 441 F.3d 977, 987, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006) citing In re Kotzab, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). See also In re Thrift, 298 F.3d 1357, 1363, 63 USPQ2d 2002, 2008 (Fed. Cir. 2002). These showings by the examiner are an essential part of complying with the burden of presenting a prima facie case of obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). If that burden is met, the burden then shifts to the applicant to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. See Id.; In re Hedges, 783 F.2d 1038, 1039, 228 USPQ 685, 686 (Fed. Cir. 1986); In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); and In re Rinehart, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976). Only those arguments actually made by appellant have been considered in this decision.

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Arguments which appellant could have made but chose not to make in the brief have not been considered and are deemed to be waived (see 37 CFR § 41.37(c)(1)(vii)(2004)).

We consider first the rejection of claims 1, 2, 4, 5 and 7-10 based on Nakanishi, Lisenker and the admitted prior art. The examiner essentially finds that Nakanishi teaches the claimed invention including a step of heating a semiconductor layer in which hydrogen is inherently incorporated into the layer. The examiner admits that Nakanishi fails to teach the claimed heating in an atmosphere containing a hydrogen isotope. The examiner notes that the admitted prior art teaches a passivation process using hydrogen. The examiner finds that it would have been obvious to the artisan to perform a passivation process on the device of Nakanishi using hydrogen as taught in the admitted prior art. Finally, the examiner cites Lisenker as teaching the advantages of replacing hydrogen with deuterium. The examiner finds, therefore, that it would have been obvious to the artisan to replace the hydrogen atmosphere of the admitted prior art with a deuterium atmosphere as taught by Lisenker (answer, pages 3-4).

Appellant argues that Nakanishi teaches oxidizing the device in a dry oxygen atmosphere which excludes hydrogen or a hydrogen-containing material such as water. Because Nakanishi

uses a dry oxygen atmosphere, appellant argues that there is no motivation to combine Nakanishi with Lisenker because Lisenker describes a wet oxygen treatment. In other words, appellant argues that the Lisenker method is usable in processes that employ hydrogen, whereas, on the other hand, Nakanishi describes a process that does not use hydrogen. Appellant also argues that the deuterium teachings of Lisenker also do not suggest that deuterium can be used to reduce random single bit data loss in a FLASH memory cell. Appellant additionally argues that there is no suggestion that the deuterium treatment of Lisenker would be effective in an erase operation because deuterium does not have the same removal properties as hydrogen (brief, pages 9-11).

The examiner responds that the dry oxygen of Nakanishi unintentionally introduces hydrogen into the process, and "it is important to replace the 'unintentional' hydrogen with deuterium." The examiner also notes that Lisenker refers to a group of MOS based devices of which FLASH memory is a subset. The examiner also responds that appellant has not pointed out how the proposed combination differs from the claimed invention in such a way that a deuterium treatment would be ineffective for an erase operation (answer, pages 6-7).

Appellant responds that Lisenker fails to support the examiner's position that hydrogen is unintentionally introduced into the silicon oxide layer. Appellant also responds that the applied prior art does not suggest the use of deuterium in a FLASH memory (reply brief, pages 1-3).

We will not sustain the examiner's rejection of claims 1, 2, 4, 5 and 7-10 for essentially the reasons argued by appellant in the briefs. Lisenker teaches that a deuterium atmosphere has advantages over a hydrogen atmosphere in many fabrication processes. The examiner uses this teaching to replace the "unintentional" hydrogen in the dry oxygen atmosphere of Nakanishi with a deuterium atmosphere. We fail to see why an artisan would have been motivated to use a deuterium atmosphere in a situation where the presence of hydrogen was not desired in the first place. In other words, there is no reason for an artisan to seek to improve upon the properties of hydrogen when there is not supposed to be any hydrogen in the environment. Even if there is unintended hydrogen, there would be no motivation to improve or enhance the properties of this unintended hydrogen. We agree with appellant that the



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modification of the applied prior art proposed by the examiner can only be the result of an improper attempt to reconstruct the claimed invention in hindsight.

Since neither Nakajima nor Sheu overcomes the deficiencies in the basic combination of references discussed above, we also do not sustain the examiner's rejection of claims 6 and 11-14.

In summary, we have not sustained any of the examiner's rejections of the claims on appeal. Therefore, the decision of the examiner rejecting claims 1, 2 and 4-14 is reversed.

REVERSED

  
KENNETH W. HAIRSTON  
Administrative Patent Judge

*Gerry Smith*  
JERRY SMITH  
Administrative Patent Judge

*MAHSHID D. SAADAT*  
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